



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

11/2

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/954,806	09/18/2001	Hiroyuki Akashi	09792909-5185	8207
26263	7590	08/12/2004	EXAMINER	
SONNENSCHEIN NATH & ROSENTHAL LLP			ALEJANDRO. RAYMOND	
P.O. BOX 061080				
WACKER DRIVE STATION, SEARS TOWER			ART UNIT	PAPER NUMBER
CHICAGO, IL 60606-1080			1745	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.	09/954,806	Applicant(s)	AKASHI ET AL.
Examiner	Raymond Alejandro	Art Unit	1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on 16 July 2004.  
 2a) This action is **FINAL**.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4) Claim(s) 1-7 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-7 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 18 September 2001 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/16/04 has been entered.

This office action is in response to the foregoing RCE and its related amendment. The applicants have overcome the objection and the 35 USC 112 rejection. Refer to applicants' rebuttal arguments submitted along with the above-mentioned RCE for additional details. However, the 35 USC 102/103 rejection is still maintained for the reasons of record. Thus, the instant claims are rejected again.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the EP 997960 reference.

The instant claims are directed to a secondary battery wherein the disclosed inventive concept comprises the specific ratio of the electrode layer thickness. Other limitations include the specific thickness range; the negative electrode material; the light metal and the particular electrolyte.

As to claims 1-2:

The EP'960 reference teaches a non-aqueous electrolyte secondary battery comprising an electrode group (2) including a positive electrode (12), a negative electrode (13) including a material for absorbing-desorbing lithium, and a separator (3), a non-aqueous electrolyte impregnated in the electrode group and including a non-aqueous solvent and a lithium salt (electrolyte) dissolved in the solvent (ABSTRACT/section 0008).

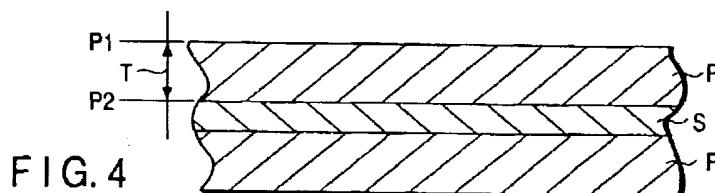
As to the limitation that the positive electrode includes a positive electrode mixture layer capable of occluding and releasing light metal, the EP'960 reference teaches that the positive electrode active material are various oxides such as lithium manganese composite oxide, lithium-containing nickel oxide, lithium-containing cobalt oxide, lithium-containing nickel cobalt oxide, lithium containing iron oxide, and lithium containing cobalt oxide, of these materials, lithium containing cobalt oxide LiCoO<sub>2</sub>, lithium containing nickel cobalt oxide LiNi<sub>0.8</sub>Co<sub>0.2</sub>O<sub>2</sub>, and lithium manganese composite oxide LiMn<sub>2</sub>O<sub>4</sub> are preferably (section 0019). *Although the instant claims do not recite the particular composition of the positive electrode, it is noted that the positive electrode active materials of the prior art has identical*

*product compositions as the positive electrode active material disclosed by the applicant (see applicants' specification, application 09/954806, page 6, line 24 to page 7, line 12).*

*Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property i.e. capable of occluding and releasing light metal, is necessarily present in the prior art active material.*

In addition, it is disclosed that **the negative electrode layer** containing an active material is made from carbon material which absorbs lithium. Examples of this carbon material are a **graphitized material** and carbonaceous material such as **graphite** (section 0027). *Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property i.e. capable of precipitating and dissolving light metal thereon, is necessarily present in the prior art active material.*

Figure 4 shows the thickness of a positive electrode active material layer wherein P represents the electrode layer (section 0119).



It is also disclosed that the positive electrode has a structure in which an electrode layer containing an active material is carried by one or both surfaces of the collector (section 0018). It is also disclosed that the negative electrode has a structure in which an electrode layer containing an active material is carried by one or both surfaces of the collector (section 0026)

The EP'960 reference teaches that the thickness of the **positive electrode layer** should be 10-100  $\mu\text{m}$ ; it follows that where positive electrode layers are formed on both surfaces of the

collector, one positive electrode layer has a thickness of 10-100  $\mu\text{m}$ , naturally, the total thickness of the two positive electrode layers formed on both surfaces of the collector is 20-200  $\mu\text{m}$ . It is also disclosed that **the upper limit in the thickness is preferably 85  $\mu\text{m}$** . (section 0119/ 0158).

*Hence, the EP'960 reference anticipates the claimed thickness, at least, from 80 to 100  $\mu\text{m}$  when one layer is formed, and at least, from 80 to 200  $\mu\text{m}$  when two layers are formed thereon.*

The EP'960 reference teaches that the thickness of the negative electrode layer should be 10-100  $\mu\text{m}$ ; it follows that where negative electrode layers are formed on both surfaces of the collector, one negative electrode layer has a thickness of 10-100  $\mu\text{m}$ , naturally, the total thickness of the two negative electrode layers formed on both surfaces of the collector is 20-200  $\mu\text{m}$ . It is also disclosed that **the upper limit in the thickness is preferably 85  $\mu\text{m}$** . (section 0125/ 0161). *Hence, the EP'960 reference anticipates the claimed thickness, at least, from 80 to 100  $\mu\text{m}$  when one layer is formed, and at least, from 80 to 200  $\mu\text{m}$  when two layers are formed thereon.*

Table 6 below shows specific examples as follows:

Table 6

	Capacity (Ah)	Thickness of one layer of positive electrode ( $\mu\text{m}$ )	Thickness of one layer of negative electrode ( $\mu\text{m}$ )
Example 37	0.38	80	80
Example A	0.35	87	90
Example B	0.05	8	8
Comparative example 12	0.30	105	108

It is apparent from Table 6 that Examples "37", "A" and "12" comprise positive and negative electrode layers having a thickness of:

- a) 80  $\mu\text{m}$  both electrode layers (Example 37);
- b) 87  $\mu\text{m}$  the positive electrode layer and 90  $\mu\text{m}$  the negative electrode layer (Example A);

c) 105 µm the positive electrode and 108 µm the negative electrode (Comparative Example 12).

Thus, specific examples falling within the claimed range are disclosed. Hence, the foregoing Examples are more than sufficient specificity (*MPEP 2131.03 Anticipation of Ranges*).

As a result the ratio (A/B) of the thickness of the positive electrode mixture layer and thickness B of the negative electrode mixture layer is as follows:

for a) the ratio (A/B) is 1.0 [Example 37];

for b) the ratio (A/B) is 0.967 [Example A];

for c) the ratio (A/B) is 0.972 [Comparative Example 12].

Thus, the battery of the EP'960 meets the specific ratio (A/B) requirement as the foregoing examples exhibit ratio (A/B) of 0.92 or more.

*Examiner's note: As to the limitation that the capacity of the negative electrode is expressed by the sum of a first capacity component by occluding and releasing light metal and a second capacity component by precipitating and dissolving light metal, since applicants disclose:*

*a) the battery of the present invention is engineered in order to attain the second component, wherein such battery engineering relies on the battery featuring a negative electrode comprising a graphitic material with certain charge capacity and a positive electrode of Li-oxide based material;*

*b) that during the process of charging, lithium metal starts to precipitate in the negative electrode at the point where the open circuit voltage (battery voltage) is lower than the overcharge voltage. In other words, the capacity of the negative electrode is expressed by the*

sum of the capacity component of occluding/releasing lithium and the capacity component of precipitating /dissolving lithium metal. The overcharge voltage means an open circuit voltage when the battery is overcharged, and indicates the voltage higher than the open circuit voltage of the full charged battery (see applicants' specification, application 09/954806, page 14, lines 13-24),

c) the ratio of the thickness (A/B) varies depending on the capacities of the positive electrode mixture layer and the negative electrode mixture layer. If the ratio (A/B) is equal to or more than 0.92, lithium metal can be stably precipitated in the negative electrode in the state where the open circuit voltage is lower than the overcharge voltage, and a high energy density and an excellent cycle characteristic can be obtained (see applicants' specification, application 09/954806, page 15, lines 9-23),

Thus, it asserted that having shown the battery of the prior art does: 1) include the same positive electrode and negative material composition; and, b) meet such ratio (A/B) requirement (i.e. the ratio (A/B) of the thickness A of the positive electrode mixture layer and thickness B of the negative electrode mixture layer is 0.92 or more), the above-mentioned battery characteristic and/or function is thus inherent as the battery structure recited in the reference is substantially identical to that of the instant claims, and therefore, claimed properties or functions are presumed to be inherent (**MPEP 2112. Requirements of Rejection Based on Inherency**). Thus, the prior art battery seems to be identical except that the prior art is silent as to an inherent function, property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in the battery described in the reference, and that it would be so recognized by persons of ordinary skill.

As to claims 3-4:

It is disclosed that the negative electrode layer containing an active material is made from carbon material which absorbs lithium. Examples of this carbon material are a graphitized material and carbonaceous material such as graphite (section 0027).

As to claim 5:

The EP'960 reference teaches that the positive electrode active material are various oxides such as lithium manganese composite oxide, lithium-containing nickel oxide, lithium-containing cobalt oxide, lithium-containing nickel cobalt oxide, lithium containing iron oxide, and lithium containing cobalt oxide, of these materials, lithium containing cobalt oxide  $\text{LiCoO}_2$ , lithium containing nickel cobalt oxide  $\text{LiNi}_{0.8}\text{Co}_{0.2}\text{O}_2$ , and lithium manganese composite oxide  $\text{LiMn}_2\text{O}_4$  are preferably (section 0019). *Thus, the light metal includes lithium.*

As to claim 6-7:

The EP'960 reference teaches that examples of the electrolytic salt contained in the non-aqueous electrolyte are lithium salts such as  $\text{LiPF}_6$  which is also most preferred (sections 0051). It is disclosed that the amount of the electrolytic salt dissolved in the non-aqueous solvent should desirably be 0.5 to 2.0 mol/l (section 0052). *Comparative Examples 4 and 6* shows that  $\text{LiPF}_6$  was dissolved in a mixed solvent in an amount of 1mol/L and 0.8mol/L, respectively (sections 0214 and 0216/Table 2). It is noted that the non-aqueous solvent is unspecified for purposes of determining its mass of substance per unit volume (density). Thus, the specific example in the prior art is understood to be within the claimed range absent that no specific nonaqueous electrolyte solvent is claimed.

Therefore, the claims are anticipated by the EP'960 reference. However, if the claims are not anticipated the claims are obvious as it has been held products claimed in terms of its function, property and/or characteristic are also obvious. *In re Best 195 USPQ 430 and In re Fitzgerald 205 USPQ 594. See rationale and/or technical reason above to reasonably support the determination that the inherent function and/or characteristic necessarily flows from the teaching of the applied prior art.*

### ***Response to Arguments***

1. Applicant's arguments filed 07/16/04 have been fully considered but they are not persuasive. The assertion that the prior art of record failed to reveal "*the first capacity component by occluding and releasing light metal; and the second capacity component by precipitating and dissolving light metal*" is not sufficient to overcome this rejection. In this regard, it is noted that applicants have argued that the battery of the present invention is specifically engineered to avoid the precipitation of lithium metal (in order to attain the specific second capacity component) by simply featuring a battery comprising a negative electrode comprising a graphitic material with certain charge capacity and a positive electrode of Li-oxide based material. Nevertheless, since the battery of the prior art does include the same positive electrode and negative material composition, the specific characteristic/function of occluding/releasing and/or precipitating/dissolving light metals is inherent because products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property i.e. capable of occluding and releasing light metal, and capable of precipitating and dissolving light metal thereon is necessarily present in the prior art active material. In addition, it is noted that the present claim language is also silent as to the specific electrode material composition, thus,

applicants' arguments are further considered to be vague and distant (not even close to) from the currently claimed invention.

Therefore, given that the examiner has provided a substantive sound basis (in fact) and a technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art, and therefore, to assert that the specific claimed occluding/releasing and/or precipitating/dissolving light metals characteristics are inherent to the very same nature of the positive electrode and negative electrode material composition of the prior art battery (*as also argued by applicants*).

Applicants' attention is particularly directed to the *Examiner's Note* presented hereinabove (refer to the *Examiner's Note* in body of the rejection above). In consequence, the prior art's battery seems to be identical except that the prior art is silent as to an inherent function, property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in the specific method described in the reference, and that it would be so recognized by persons of ordinary skill. As a result, once a reference teaching method appearing to be substantially identical is made the basis of the rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts to the application to show an unobvious difference. Hence, applicants need to prove the prior art does not necessarily or inherently possess the characteristics, and/or function of his/their secondary battery. *In re Fitzgerald 205 USPQ 594, 596 and In re Best 195 USPQ 430* (See **MPEP 2112. Requirements of Rejection Based on Inherency**).

As a result, the examiner asserts that it is not enough that applicant's representative personally believe that the prior art does not perform or teach such inherently identified

characteristic/function. That is to say, the arguments of counsel cannot take the place of evidence in the record. An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a *prima facie* case of inherent anticipation/obviousness (See *MPEP 2145 Consideration of Applicant's Rebuttal Arguments*).

2. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies:

- a) "*the second component is characterized by a higher charge density than that associated with light metal ion occlusion*";
- b) "*the relative quantities of positive electrode and negative electrode are such that a part of the lithium released by the positive electrode cannot be occluded in the negative electrode, and thus deposits as a metal*" [no specific quantity has been clearly stipulated in the present claims so as to constructively claim this limitation];

- c) "*the charge capacity of the electrode material is determined by other characteristics such as its porosity*",

are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

3. With respect to applicants' arguments that "*the EP '690 specifically states that said porosity must be higher than that of the positive electrode, so as to prevent precipitating lithium dendrite, i.e. the formation of lithium metal precipitates, thus teaching away from the subject matter of the present application*", arguments that the alleged anticipatory prior art teaches away

from the invention are not germane to a rejection under section 102 (*See MPEP 2131.05 Nonanalogous Art*).

4. As to the performance of the exemplified batteries of Table 1, the examiner likes to contend that such results and, thus, the specific precipitating/dissolving capacity component as prepared in the examples of Table 1 are not commensurate to the specific secondary battery as claimed in claims 1-7. In this respect, it is emphasized that the claimed *secondary battery power* lacks significant, essential, vital and/or crucial features, for instance, the specific electrode material, battery components including binder material, the specific conducting agent material, the specific current collector, the specific electrolyte comprising both the salt and the solvent and the specific mass ratio (weight composition) of every single battery component as presented in those examples. Thus, the foregoing performance characteristics of the exemplified *secondary batteries* do not reflect or correspond to the performance characteristic of the claimed secondary battery. Hence, the examples presented in TABLE 1 do not correspond in terms of substance or constitution to the claimed subject matter. Furthermore, it is contended that a 102-inherency rejection cannot be overcome by presenting the achievement of unexpected results. Thus, the examples presented in TABLE 1 do not correspond in terms of substance or constitution to the claimed subject matter.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro  
Examiner  
Art Unit 1745

